AMUSEMENT APPARATUS AND METHOD

FIELD OF THE INVENTION

This invention is made up of mechanical and visual motion simulation aspects. In particular this invention combines a motion simulator with projected visual images in a custom method described below.

BACKGROUND OF THE INVENTION

Previously, other spherical theaters worked like this: The films are projected on a hemispherical screen that provides tourists with a new visual experience by projecting film with film projector at the center of the hemisphere screen, but only a planar image can be projected as only one projector is adopted. Furthermore, tourists watch a movie by sitting in the motionless passenger seats arranged in longitude with space in relation to each other, which gives an unrealistic feeling of outside observation. Since the goal of this type of theater is to bring extreme realism, the visual effect is not quite ideal due to the limitations of the above reasons.

SUMMARY OF THE INVENTION

Our present invention is aimed to solve the problem where this type of simulator, which would reside in an amusement park or similar entertainment venue, that does not provide tourists with immersed enough experience. The present invention provides a motion simulator for entertainment purposes that can move tourists and produces a convincing illusion of actual flight in a surrounding scene. The purpose of the present invention is to provide a new amusement motion simulator apparatus and method that is combined with projecting image, which enables the tourist to feel like really flying in the sky.

The present invention resides in an amusement motion simulator, comprising hemispherical screen, projector assembly, and platform. This

platform is linked to a rotating shaft and located on the platform stanchion. The said projector assembly is comprised of at least one projector. The projector assembly is located in the central part of the platform that is hollow, and linked to the machine room tower. Multiple aligned seats that serve as passenger stations round the projector assembly are positioned on the platform in front of the screen that are spaced apart in fore and aft relation. The said seats are suspended from a hanging bracket by a rotating shaft. The hanging bracket is linked to the platform and each of the aligned seats is attached to the platform by a pivot structure for creating a pivoting motion for certain angles around the suspended rotating shaft. There is a motorized drive set positioned at the both ends of the platform rotating shaft which can drive the platform to pivot round the platform rotating shaft.

In the preferred embodiment, the sphere screen is hemisphere screen and two projectors are positioned at the center of the sphere screen.

Two columns of passenger seats located at both sides of the projector assembly can turn a certain angle around the vertically yawing rotating shaft linked with the platform by the yawing structure. An air blower beneath the platform that blasts upwards is positioned at the side adjacent to the screen.

The said drive set can be a reversed cylinder, hydraulic cylinder or wire cable draft gear. The said pivoting device and yawing device can be a hydraulic cylinder. The passenger seats are four rows in horizontal orientation and three columns in vertical orientation. The three columns of passenger seats are arranged with some space from one another, each aligned set of passenger seats is separated from one another by blocking plate.

The platform can pivot at a certain angle upon the platform-rotating shaft in a vertical plane. In the preferred embodiment, the rotating angle is $\pm 10°$. The aligned passenger seat can pivot $\pm 10°$ upon the suspending rotation shaft. The said passenger seats can turn 10 ° round the yawing shaft.

There is a platform canopy matched with the platform area and the height of the passenger seats on the machine room tower. The canopy can pivot upon

the rotating shaft.

The motion simulating method of present invention comprising the following steps,

a. The platform is in horizontal position. Close the platform canopy.
b. Passengers board the platform, take their seats and fasten their safety belts.
c. The system begins to work. The platform canopy is pulled up and the platform is turned to upright position where the passengers face the screen. Then left and right column of seats are yawed a certain angle towards the screen.
d. Project image on the projection screen, platform and passenger seats controlled by computer can pitch up and down matching the images. In addition, air blower blasts upwards beneath the seats.
e. When the movie is over, the left and right column of seats are yawed back. The platform turns to horizontal position. The platform canopy lies down and the safety belts are released. Passengers leave through the exit aisle.

The present invention can project a 2D or 3D image on the screen by one or two projectors respectively. The revolving platform and swaying seats move synchronously with the images to enhance the realistic effects. The present invention has the following advantages over the previous similar devices:

a. More passengers can be accommodated to view image at one time.
b. It is more convenient and safe for the passengers to go into and out of the machine.
c. Passengers are just before the display screen, which enable them to have a wider view and will not impede each other's lines of vision.
d. Passengers seating in passenger seats are suspended in the air combining the pitching motion of the seats, which enhance the illusion of

real flight.

BRIEF DESCRIPTIONS OF THE DRAWINGS

The preferred embodiment of the invention will be described below in connection with the accompanying drawings, in which:

FIG 1. is a structural schematic side view of the platform in horizontal position in the preferred embodiment of the invention.

FIG 2. is a structure schematic cut away view of the platform in upright position in the preferred embodiment of the invention.

FIG 3. is a front view of the platform in upright position in the preferred embodiment of the invention.

FIG 4. is a front view of the platform in horizontal position in the preferred embodiment of the invention.

FIG 5. is a top view of the platform in horizontal position in the preferred embodiment of the invention.

FIG 6. is a top view of FIG 3.

FIG 7. is a top view indicating the two sided column seats in FIG 6 positioned towards the screen.

FIG 8. is an upward view of FIG 7.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG 1, 2 and 3. They are drawings of a preferred embodiment of the present invention, comprising of the hemisphere screen 1 or other forms of screens and display assembly positioned at the center of the hemisphere screen. Platform 5 is positioned on the support stanchion 4 and linked with platform rotating shaft 3. Hemisphere screen 1 is located just in front of platform 5. There are one or two projectors positioned inside the machine room at the center of the hemisphere screen. There is a hollow space in the middle part of the platform 5 that enables the platform to be kept away from the machine room at any position and ensures there is enough safety space between the

passenger seats and the equipment room. The Machine room is sustained by the tower 6 and is completely independent from the platform 5. The Route way to the machine room is inside the structure of tower 6 connecting to outside. Passenger seats 7 arranged in longitudinally and transverse directions around the projector assembly are positioned on the platform 5. The passenger seats are suspended by hanging bracket 8 by suspended rotating shaft 9. The hanging brackets 8 link to the platform 5. As FIG 3, 4 and 5 indicate in a preferred embodiment, the passenger seats can be arranged in four rows in horizontal orientation and three columns in longitudinal orientation. Sufficient space between rows and columns enable passengers to enter between the seats and be seated. Blocking plate 13 above the passenger seats in row set the passenger seat in up and down relation. Blocking plate 13 can pivot with passenger seats together as passenger seats pitch up and down and confines the passenger's view in a certain scope from upside. An ancillary section, including queuing area, waiting area, entrance aisle 17, exit aisle 18 and stationary platform, defines the route way that passenger board and debark the platform.

Referring to FIG 2, 3 and 4, the drive set 10 that can drive platform rotate around it is positioned at the both ends of the platform-rotating shaft 3. The drive set can be reversed cylinder, hydraulic cylinder or steel wire draft gear, etc. Platform 5 rotates around the platform rotation shaft 10 by reversed cylinder. Passenger seats 7 and the suspended rotating shaft 9 are in converse rotating relation while platform 5 rotating from the horizontal position to the upright position, the suspended structure rotates from the upright position to the horizontal position. But every passenger seat 7 always keeps in the hanging state and only changes its position in the same vertical plane. The platform 5 in the vertical position can pitch up and down certain angles, for example $\pm 10^{\circ}$. When pitching down, the passenger seat in the upside, close to the screen, forming looking down effect, which is reverse when pitched up. When the platform 5 is in the upright position, aligned passenger seats 7 can pivot a

certain angle, for example $\pm 10°$ upon the suspending rotating shaft by hydraulic cylinder 33 and the clutch 31 that links with the hydraulic cylinder positioned in the joint of the passenger seats and platform. This causes the passenger seats pitching up and down. FIG 6, 7 and 8 indicate that there is yawing structure 11 behind the outboard of the two columns of passenger seats 7 at the left and right side of the projector assembly 2. The yawing structure 11 can make the passenger seats in the left and right columns rotate around the yawing shaft positioned in the inboard of the two columns passenger seats and linked with the platform 5. The yawing structure can be a yawing cylinder. The two columns of seats 7 can rotate certain angle, for example 10° towards the screen, which enable the viewing field of the passengers sitting in the two columns passenger seats to be more focused on the central part of the screen to achieve a better viewing effect. The Air blower 16 beneath the platform that blasts upwards is positioned at the side close to screen 1. The air blower 16 can blast upwards and this enables passengers to feel the gale from underside, which will make passengers have a realistic sensation when combined with the diving scene displayed on the projection screen.

As FIG 1 indicates, there is a platform canopy 15 positioned on the tower 6. The canopy 15 matched the platform's area and passenger seats' height can rotate round the rotating shaft 14. The canopy 15's area does not exceed the bond of the platform and its height is not lower than that of the passenger seats and hanging structure. It can cover all the passenger seats in closed space when the passengers board and debark the platform. Wire rope is linked with the hanging point of the canopy. The canopy can pivot a certain angle upon the canopy shaft by pulling up and laying down the wire rope. When pulling up the wire rope, the canopy is opened and closed when laying down the wire rope. The rotation of the platform is not affected when the canopy is open.

The method of providing passengers with a combined viewing and motion experience is comprised of the following steps.

First, the platform 5 is in the horizontal position. Close the canopy 15. Second, the passengers board the platform 18 through the entrance aisle 17 from stationary platform, sit on the passenger seats 7 and fasten their safety belt.

Third, pull up canopy 15, start the reversed cylinder which drives the platform rotate until the upright position is reached in which the passenger face the projection screen, and start the yawing cylinder driving to the left and right longitudinally aligned seats rotate certain angle, say 10 ° , towards the projection screen. Fourth, the image is projected on to the screen. Coordinate the movement of the platform 5 and passenger seats 7 to the sequence of images displayed in the projection screen to obtain a predetermined coordinating of pitching up and down movements experience by the passenger with the images viewed by the passenger. The pitching up and down movement of platform and that of the passenger seats can work together and coordinate with each other, consisting more complicated movement to simulate the flying effect that gives passengers a realistic feel. The air blower beneath the passenger seats can blast upwards and enable passengers to feel the gale from underside, which will make passengers feel so real when combining with the diving scene displayed on the screen. Finally, the movie is over. The left and right longitudinally aligned seats 7 yaw back to original position and the platform 5 rotates to horizontal position. Lay down the canopy 15. The safety belt is loosened and passengers leave through exit aisle 18.

Although the invention has been described with respect to certain preformed embodiments, the invention's claim is not limited to the described preferred embodiments but includes such variations of the described inventions as would be evident to the worker of ordinary skill in this art.